REMARKS

Claims 1, 2 and 4-11 are pending. The Examiner has allowed claim 11. The Examiner has rejected claims 1, 4 and 5 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 3,663,870 to Tsutsumi *et al.* The Examiner has rejected claims 1 and 2 under 35 U.S.C. § 102(b) as anticipated by German Letters of Disclosure No. 4028062. Claims 1, 6, 7 and 10 are rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,638,346 to Inami *et al.* Claims 7, 8 and 9 are rejected under 35 U.S.C. § 103(a) as unpatentable over German Letters of Disclosure No. 4028062 in view of Inami *et al.* Applicants respectfully traverse the rejections of claims 1, 2 and 4-10 without prejudice to the allowance of claim 11.

The Claims Are Not Anticipated

The Examiner alleges that Tsutsumi *et al.* ("Tsutsumi") anticipates claims 1, 4 and 5 of the present invention. Tsutsumi discloses a semiconductor possessing a field effect transistor comprising passivation layers at the channel. Importantly, Tsutsumi improves upon conventional methods for stabilizing the surface of the semiconductor substrate. The patent teaches a method of creating a layer of film consisting of an oxide selected from a group that includes scandium. Further, Tsutsumi discloses the use of a gate electrode which is applied to the oxide layer and which is located between the source region and the drain region.

However, Tsutsumi does not teach each and every element of claims 1, 4 and 5 of the present invention. In particular, claim 1 of the present invention discloses a gas sensor function that is enabled by means of measurement of the work function of the utilized metal components. In contrast, Tsutsumi describes a "semiconductor device" that allows for increased ability to etch the insulator film, as well as increased stability of the semiconductor substrate. Tsutsumi discloses the use of an insulator film comprised of an oxide of at least one of yitrium, scandium, europium, samarium, terbium, and dysprosium. The Tsutsumi reference aims to improve the surface portion of the semiconductor substrate for the purpose of, for example, protecting the insulator film from moisture, dirt, and other foreign matter (column 1, lines 9-14). In light of the novel technique of alcohol sensing introduced in claim 1 of the present invention, the Examiner's assertion that Tsutsumi anticipates independent claim 1 and dependent claims 4 and 5 is unfounded. Furthermore, the Examiner's assertion that "Tsutsumi's device is inherently capable of detecting a chemical in a gas," without a demonstration of support thereof, is misplaced and constitutes improper speculation and hindsight on the part of the Examiner.

Even assuming, *arguendo*, that the objectives of the two inventions are similar, the structure of the present invention differs significantly from that of Tsutsumi. Specifically, Tsutsumi discloses a double-layered insulator film comprising an inorganic metal oxide.

However, unlike the present invention, the "gate electrode G of aluminum is applied onto the insulator film structure 78 covering an electric conductive channel extending between the source region 72 and the drain region 73" (column 7 lines 3-6). Figure 6 confirms that Tsutsumi teaches an insulator layer that is applied directly to the gate region and thus does not disclose the use of a space between the insulator film and the field effect transistor. Claim 1 of the present invention specifically states that the gas-sensitive layer "is applied separately to the substrate such that it is substantially opposite a gate region of the field-effect transistor thereby forming a gap there between." In light of this structural inconsistency, Tsutsumi does not teach each and every element of independent claim 1 of the present invention and thus does not anticipate the present invention.

The Examiner alleges that German Letters of Disclosure No. 4028062 ("DE '062") anticipates claims 1 and 2 of the current invention. DE '062 describes an apparatus for a gas sensor having a field effect transistor with an interrupted gate. Importantly, the gas-sensitive layer described in DE '062 is applied directly to the gate of the field effect transistor.

DE '062 does not anticipate claims 1 and 2 of the present invention. Claim 1 comprises a gas-sensitive layer that "is applied separately to the substrate such that it is substantially opposite a gate region of the field-effect transistor thereby forming a gap there

between." Therefore, the scope of claim 1 is limited to Variant 1 of Figure 1, which distinguishes the present invention from that of DE '062. Because DE '062 does not disclose or suggest the positioning of the gas-sensitive layer separate from the gate region, thereby creating a space therein, it does not teach every limitation of independent claim 1. Therefore claims 1 and 2 of the present invention are not anticipated by DE '062.

The Examiner alleges that claims 1, 6, 7 and 10 are anticipated by Inami *et al.* ("Inami"). Inami discloses a field effect transistor for measuring humidity comprising a field effect transistor and based on the electric conductivity of a moisture sensitive means. In particular, Inami improves upon conventional moisture-sensitive means by disclosing a moisture-sensitive material containing crosslinked cellulose acetate butyrate with at least one selected from compounds containing two or more isocyanate groups, epoxy groups, carboxylic groups, or acid anhydrides of carboxylic acids.

However, Inami does not teach each and every element of claims 1, 6, 7 and 10 of the present invention. Specifically, Inami discloses a "moisture sensitive means" as incorporated within a field effect transistor type sensor. The "moisture sensor" of Inami does not disclose the gas-sensitive layer of the present invention. The ability of the present invention to utilize a FET device to sense gases such as ethanol is distinct from the mere detection of water particles in air

as described by Inami. Inami thus does not teach each and every element of independent claim 1 and cannot be said to anticipate the present invention.

Even assuming, *arguendo*, that the moisture sensor of Inami anticipates the gas sensor of the present invention, the structure of the field effect transistor type moisture sensor described by Inami is distinct from that of the present invention. In particular, claim 1 of the present invention states that the gas-sensitive layer "is applied separately to the substrate such that it is substantially opposite a gate region of the field-effect transistor thereby forming a gap there between." As evident in Figure 1 of Inami, the moisture sensor is applied directly to the gate region without the creation of a space between the moisture-sensitive layer and the gate. For these reasons, Inami does not anticipate independent claim 1 or dependent claims 6, 7 and 10 of the present invention.

The Claims Are Not Obvious

The Examiner alleges that claims 7, 8 and 9 are unpatentable over German Letters of Disclosure No. 4108062 ("DE '062") in view of Inami *et al.* ("Inami"). DE '062 describes an apparatus for a gas sensor having a field effect transistor with an interrupted gate. Of notable importance is the fact that the gas-sensitive layer described in DE '062 is applied directly to the

gate of the field effect transistor. Inami teaches a device for measuring humidity comprising a field effect transistor and based on the electric conductivity of a moisture sensitive means.

Consideration of DE '062 in conjunction with Inami does render obvious the present invention. Specifically, the present invention represents a significant improvement upon the prior art in its ability to measure a change in work function by using specific material layers to determine the alcohol content of gases ***and also*** by changing the structure of the field effect transistor to situate the gas-sensitive layer separate from the field effect transistor and adjacent to the gate electrode such that there is an open space formed between the gas-sensitive layer and the field effect transistor. As such, not all limitations of independent claim 1 are rendered obvious by the Examiner's proposed combination of prior art references.

Another example of the innovation of the present invention is the additional use of an extra moisture-sensitive layer to compensate for cross-sensitivities. The fact that the abstract of DE '062 acknowledges the interference of moisture with alcohol sensing, as reiterated by the Examiner, does not suffice to prove obviousness, as one of ordinary skill in the art would not have been motivated to combine DE '062 with Inami in the manner proposed in order to realize the unique properties that characterize the present invention. The limitation of claim 1, namely the restriction of the invention to field effect transistors with a gas sensitive layer that is

placed separate from the substrate layer, serves to defeat the Examiner's rejection based on obviousness. As such, dependent claims 7, 8 and 9 are not obvious.

For the foregoing reasons, Applicants respectfully request allowance of claims 1, 2 and 4-10. Applicants believe that no fee is due in connection with this amendment. However, the Commissioner is hereby authorized to charge payment of any unanticipated fee or credit any overpayment to Deposit Account No. 02-4377.

Respectfully submitted,

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